

CLAIMS

What is claimed is:

1. An apparatus, comprising:
 - a die having a bottom surface;
 - an embossing foil disposed above the bottom surface;
 - a mandrel having a rod portion that extends through a central portion of the die, the mandrel to receive a substrate;
 - a ball bushing disposed around the rod portion; and
 - a ring portion disposed between the ball bushing and the embossing foil to hold a precise alignment of a centerline of the rod portion and a centerline of the embossing foil.
2. The apparatus of claim 1, wherein the mandrel is tapered to receive the substrate having a hole defined by an inner dimensional edge of the substrate.
3. The apparatus of claim 2, further comprising an outer sleeve disposed around the rod portion and in contact with the embossing foil.
4. The apparatus of claim 3, wherein a thermal expansion of the ball bushing secures the ring portion to an inner dimension of the embossing foil to center the substrate with the embossing foil.
5. The apparatus of claim 3, wherein the outer sleeve lifts a center portion of the embossing foil to separate the substrate from the embossing foil.
6. The apparatus of claim 1, wherein the bottom surface comprises an elastomeric pad.
7. The apparatus of claim 1, wherein the substrate comprises a disk.

8. A method, comprising:
 - providing a die assembly having a shaft and an embossing foil;
 - heating a ball bushing disposed around the shaft; and
 - aligning a centerline of the shaft with a centerline of the embossing foil.
9. The method of claim 8, wherein heating further comprises expanding the ball bushing to secure the shaft to the embossing foil.
10. The method of claim 9, wherein aligning further comprises engaging a ring portion disposed around the shaft to the embossing foil.
11. The method of claim 10, wherein aligning further comprises receiving a substrate having a hole defined by an inner dimensional edge of the substrate, the substrate having an embossable film disposed thereon.
12. The method of claim 11, further comprising aligning a centerline of the substrate with the centerline of the embossing foil.
13. The method of claim 12, further comprising pressing the embossing foil into the embossable film of the substrate.
14. The method of claim 13, further comprising separating the embossing foil from the embossable film.
15. The method of claim 14, wherein separating further comprises raising the ring portion near the inner diameter of the substrate.
16. The method of claim 10, further comprising pre-heating the embossable foil to an approximate embossing temperature.

17. An apparatus, comprising:
 - means for positioning a substrate within a die assembly; and
 - means for centering the substrate relative to an embossing foil with a ball bushing disposed within the die assembly.
18. The apparatus of claim 17, wherein means for centering further comprises means for expanding the ball bushing to align a centerline of the embossing foil relative to a centerline of the substrate.
19. The apparatus of claim 18, further comprising means for pressing the embossing foil into an embossable film disposed on the substrate.
20. The apparatus of claim 19, further comprising means for separating the embossable foil from the embossable film.
21. The apparatus of claim 20, further comprising means for pre-heating the embossable film.
22. An apparatus, comprising:
 - an upper die assembly;
 - a lower die assembly;
 - a draw bar to couple the upper die assembly to the lower die assembly;
 - a press base plate disposed below the lower die assembly; and
 - an gas actuation bladder disposed below the press base plate to move the upper die assembly towards the lower die assembly along the draw bar.
23. The apparatus of claim 22, further comprising a cross bar disposed above the upper die assembly and coupled to the draw bar.

24. The apparatus of claim 23, wherein an inflation of the gas actuation bladder lowers the cross bar.
25. The apparatus of claim 22, further comprising a post disposed between the upper die assembly and the lower die assembly.
26. The apparatus of claim 22, wherein the gas actuation comprises a high force sealed bladder.